

What is claimed is:

1. A tilt steering apparatus comprising a tilt adjustable steering column, comprising:

a fixed bracket fixed to a body of a vehicle;
a tilt bracket fixed to the steering column;
side plates provided in the fixed bracket;
side plates provided in the tilt bracket and sliding along the side plates of the fixed bracket at a time of tilt adjustment;

a supporting shaft passing through respective insertion holes of the side plates of the fixed bracket and the tilt bracket;

a lock lever rotatable in the locking direction and the locking releasing direction around an axis of the supporting shaft and rotated in the locking direction to lock the steering column to an adjusted tilt position; and

a cam surface and a cam follower which are relatively rotated while being brought into sliding contact with each other as the lock lever is rotated,

the cam surface including a plurality of slopes corresponding to a rotation stroke position of the lock lever,

the cam surface pressing the cam follower as

the lock lever is rotated in the locking direction so that the side plates of both the brackets are pressed against each other, resulting in the steering column being locked at the adjusted tilt position.

2. The tilt steeling apparatus according to claim 1, wherein

the cam follower is moved in a first direction relative to the cam surface when the lock lever is stroked in the locking direction,

the plurality of slopes of the cam surface include first and second slopes which are upward slopes in the first direction, the second slope being gentler than the first slope, and

the cam follower slides from the first slope of the cam surface to the second slope thereof when the lock lever is stroked in the locking direction.

3. The tilt steering apparatus according to claim 2, wherein

the plurality of slopes of the cam surface include a third slope which is an upward slope in the first direction, the third slope being gentler than the second slope, and

the third slope corresponds to a rear of a

stroke in the locking direction of the lock lever,
and

the cam follower successively slides toward the first, second and third slopes of the cam surface in this order when the lock lever is stroked in the locking direction.

4. The tilt steering apparatus according to claim 2, wherein

the plurality of slopes of the cam surface include an inverse slope which is a downward slope in the first direction,

the inverse slope corresponds to a rear of a stroke in the locking direction of the lock lever, and

the cam follower slides toward the first and second slopes and the inverse slope of the cam surface in this order when the lock lever is stroked in the locking direction.

5. A tilt steering apparatus comprising a tilt adjustable steering column, comprising:

a fixed bracket fixed to a body of a vehicle;
a tilt bracket fixed to the steering column;
side plates provided in the fixed bracket;
side plates provided in the tilt bracket and
sliding along the side plates of the fixed bracket

at a time of tilt adjustment;

a supporting shaft passing through respective insertion holes of the side plates of the fixed bracket and the tilt bracket;

a lock lever rotatable in the locking direction and the locking releasing direction around an axis of the supporting shaft and rotated in the locking direction to lock the steering column to an adjusted tilt position;

a cam surface and a cam follower which are relatively rotated while being brought into sliding contact with each other as the lock lever is rotated; and

means for increasing an operating torque of the lock lever at a front of a stroke in the locking releasing direction of the lock lever,

the cam surface and the cam follower constituting means for increasing the operating torque of the lock lever,

the cam surface pressing the cam follower as the lock lever is rotated in the locking direction of the lock lever so that the side plates of both the brackets are pressed against each other, resulting in the steering column being locked in the adjusted tilt position.

6. The tilt steeling apparatus according to claim 5, wherein

the cam follower is moved in a first direction relative to the cam surface when the lock lever is stroked in the locking direction,

the cam surface includes an inverse slope which is a downward slope in the first direction, and

the inverse slope of the cam surface corresponds to the front of the stroke in the locking releasing direction of the lock lever.

7. The tilt steering apparatus according to claim 5, wherein

the cam follower includes a cam follower surface which is substantially brought into contact with the cam surface at an edge in correspondence with at least the front of the stroke in the locking releasing direction of the lock lever.

8. The tilt steering apparatus according to claim 7, wherein an angle of inclination of the cam follower surface differs from an angle of inclination of an area, corresponding to at least the front of the stroke in the locking releasing direction of the lock lever, of the cam surface.

9. The tilt steering apparatus according to claim 5, wherein

the cam surface includes an area corresponding to the front of the stroke in the locking releasing direction of the lock lever, a recess concaved by providing a step in the area.

10. The tilt steering apparatus according to claim 9, wherein

the cam follower includes a cam follower surface which is brought into contact with the cam surface, and

the cam follower surface includes a projection which is engaged with the recess of the cam surface in correspondence with a rear of a stroke in the locking direction of the lock lever.

11. The tilt steering apparatus according to claim 9, wherein

an area, corresponding to the front of the stroke in the locking releasing direction of the lock lever, of the cam surface includes a portion having no slope.